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Bras, H.; Neven, M.

published in

Population Studies : A Journal of Demography
2007

DOI (link to publisher)

[10.1080/00324720601048319](https://doi.org/10.1080/00324720601048319)

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citation for published version (APA)

Bras, H., & Neven, M. (2007). The effects of siblings on the migration of women in two rural areas of Belgium and the Netherlands, 1829-1940. *Population Studies : A Journal of Demography*, 61(1), 53-71.
<https://doi.org/10.1080/00324720601048319>

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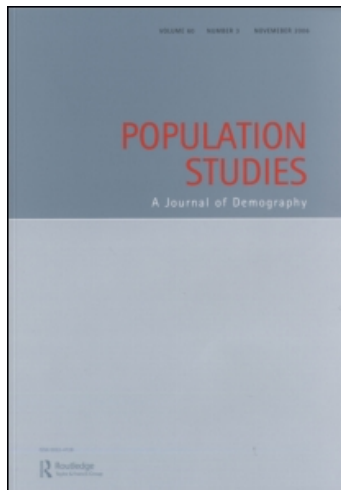
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Population Studies

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713689546>

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To cite this Article Bras, Hilde and Neven, Muriel(2007) 'The effects of siblings on the migration of women in two rural areas of Belgium and the Netherlands, 1829-1940', Population Studies, 61: 1, 53 — 71

To link to this Article: DOI: 10.1080/00324720601048319

URL: <http://dx.doi.org/10.1080/00324720601048319>

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The effects of siblings on the migration of women in two rural areas of Belgium and the Netherlands, 1829–1940

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This study explores the extent to which the presence and activities of siblings shaped the chances of women migrating to rural and urban areas in two rural areas of Belgium and the Netherlands during the second half of the nineteenth and first decades of the twentieth century. Shared-frailty Cox proportional hazard analyses of longitudinal data from historical population registers show that siblings exerted an additive impact on women's migration, independently of temporal and household characteristics. Just how siblings influenced women's migration depended on regional modes of production and on employment opportunities. In the Zeeland region, sisters channelled each other into service positions. In the Pays de Herve, where men and women found industrial work in the Walloon cities, women were as much influenced by their brothers' activities. Evidence is found for two mechanisms explaining the effects of siblings: micro-economic notions of joint-household decision-making and social capital theory.

Keywords: siblings; migration; joint-household decision-making; social capital theory; social networks; life course; the Netherlands; Belgium; event-history analysis

[Submitted December 2005; Final version accepted July 2006]

Introduction

Sibling relationships entail powerful emotional bonds, expressed in competition, rivalry, and envy on the one hand and solidarity, support, and amicability on the other (Bank and Kahn 1982; Cicirelli 1995). The sibling tie is also one of the longest-lasting relations in people's lives: siblings often share more years of their lives with one another than they share with their parents. Although sociologists and psychologists have paid a fair amount of attention to sibling relationships (Allan 1977; Schvaneveldt and Ihinger 1979; Bank and Kahn 1982; Goetting 1986; Bedford 1989; Lee et al. 1990; Connidis 1992; Cicirelli 1995; White 2001), little is known of how siblings, and their mutual ties, shape demographic behaviour. Recently, Hobcraft has made a plea for the inclusion, among other things, of personal ties as explanatory factors in demography (2006, pp. 162–3, 170–2). An emphasis on interdependence and its effects on social and demographic behaviour has also been one of the central tenets of the burgeoning field of life-course studies during recent decades

(Giele and Elder 1998; Settersten 1999; Hagestad 2002). In the life-course perspective, groups of individuals who populate a person's social contexts are seen as configurations of people with whom individuals travel over their lives and who positively or negatively affect their transitions and pathways (Kahn and Antonucci 1980; Hagestad 2002). For example, a study of the effects of social contexts on adolescents' lives by Cook and associates found that schools, neighbourhoods, peers, and families had independent and additive influences on adolescent school success (Cook et al. 2002).

In this paper, we begin exploring to what extent siblings contribute to an explanation of the variance in the prevalence and timing of transitions in people's lives. On the rare occasions that siblings' characteristics are included in studies of demographic behaviour, it is often only parity that is used (Derosas and Oris 2002; Van Poppel et al. 2003). But the effects of siblings are more than just the consequences of an individual child's particular order of birth.

The composition and experiences of the sibling group are highly variable. As well as the births (and

deaths) of siblings, there are their marriages and accompanying departures, and migrations away from the household to work and returns back into the household. As far as we know, only one study explicitly focuses on the influence on individuals' behaviour of their siblings' activities. Using the Census Public Use Sample of 1910, Sharon Sassler (1995) examined how, at the beginning of the twentieth century, the presence and activities of siblings shaped whether American working-age daughters engaged in paid employment, worked at home, or attended school. Although innovative, an important drawback of the study is its reliance on the kind of snapshot information typical of censuses, providing static evidence on family configurations in a particular year. This type of study cannot address questions about essentially dynamic processes, such as what happens to the chance of a daughter migrating when her brother marries and leaves the household, or reliably identify cause and effect. Moreover, census material allows only the transitions of co-resident girls to be investigated; there is no possibility of studying their migrations in and out of the household.

During the nineteenth century and the first half of the twentieth, leaving home to work elsewhere was an essential part of women's pathway from youth to adulthood. In many regions, young unmarried women migrated either to enter farm service or domestic service (Dribe 2001; Bras 2004) or to find employment in factories and workshops (Alter 1988; Janssens 1993; Neven 2003). Building on Sassler's approach, the study presented here explores the extent to which the behaviour of their siblings shaped young women's migration to rural and urban locations. Using continuous longitudinal data from historical population registers, we chart the effects of siblings on women's migration in two rural settings with different modes of production and employment opportunities—the Dutch region of Zeeland and the Belgian Pays de Herve region. In the following section, ideas and research findings based on studies of joint-household decision-making and social capital theory are used to formulate expectations about the possible mechanisms by which siblings' activities influenced women's migration. Next, we describe the two regions and formulate region-specific hypotheses. After we have introduced our data-sets, methods, and measures, we report the results of our analyses of the effects of siblings' presence and activities on women's migration risks. In the concluding section we discuss our results and suggest topics for future research.

Theoretical framework and previous research findings

Joint-household decision-making

In the study of migration, micro-economic notions of joint-household decision-making or of household strategies are often used as an explanatory framework (Wood 1981; Trager 1984; Lauby and Stark 1988; Massey 1990; Stark 1991; Baud 1994; Lucas 1997). Essentially the idea is that in order to maximize family utility, families choose the most profitable behaviour for a particular household member in a given situation, and the result is a particular allocation of resources and of specialization of tasks and activities among family members (Chayanov 1966; Becker 1973). As well as being directed towards maximizing household income, household strategies may also have the aim of minimizing risk. Risk diversification is practised when households choose to reduce the variance of pooled household income by placing family members in different labour markets that perform in ways that are not highly correlated (Stark 1991, p. 231; Lucas 1997, p. 749). In both situations, opportunities given to, or imposed on, a particular child may make possible or rule out behavioural options open to another child. Trade-offs could first of all be based on general substitution: parents allowing one child to substitute for another, regardless of sex or birth order. A child who marries and subsequently leaves the parental home is a financial loss to the family and parents may arrange for one or more of the remaining siblings to substitute for this loss. As a consequence, that sibling's chances of leaving home to find employment may be increased. The same mechanism may also apply in other cases of immediate economic stress, such as when a parent dies.

Empirical studies have shown that in earlier times, parents made trade-offs on the basis of, amongst other characteristics, sex and birth order (Adams and Kasakoff 1992; Barrera-González 1992; Kurosu 1996; Van Eijck 1996; Wall 1996; Dribe 2001). Prompted by societal norms, sex-specific labour market opportunities, and the potential financial contributions of their sons and daughters, parents may have given priority to advancing the prospects of sons over those of daughters (Davidoff 1995, p. 210; Sassler 1995, p. 559). Where men's wages were higher, boys were likely to have benefited from longer schooling because it would have enabled them to find better-paid jobs later on in their careers.

This is the case today in many less developed countries, where women's work as domestic servants pays for their brothers' school careers (Camacho 1999). In these circumstances the presence of many brothers in the household is likely to increase women's likelihood of migration.

Where boys profited from longer schooling, the position of girls—especially those from the higher and middle classes—improved if they were not required to find paid employment but could reside in the parental home until marriage, assuming they did not want to leave home for work. When parents assigned priority to daughters' prospects, it was the brothers who might have had to migrate. However, the majority of unmarried European women from working-class and lower-middle-class backgrounds were in paid employment (Motte and Pelissier 1995; Matthijs 2003). Working outside the parental home enabled them to save money in order to be able to marry as soon as possible (Wrigley et al. 1997, pp. 123–5).

Parents could also have made trade-offs according to children's birth orders. The presence of many younger siblings would have increased older women's chances of migrating. Older siblings were often more experienced and could expect higher wages in recognition of their seniority and skill. Trade-offs according to age may also have been sex-specific, with younger sisters, not brothers, increasing a girl's probability of migration. One exception to trading-off by age would have been when parents more or less systematically assigned care-giving obligations, such as caring for very young siblings, to a particular daughter.

From a household decision-making perspective, instead of trade-offs among siblings, simultaneously arranging for the migration of more than one sibling could also have had advantages. Since the migration of one sibling would reduce the net costs of migration for the others, it would have been profitable to make arrangements at the same time for two or more to migrate, in a particular order (Palloni et al. 2001, pp. 1265–6). The fact that some had left already would have had the effect of reducing not only the financial costs of migration to the family, but also the psychological costs. In the contemporary migration of Asian and Latin-American women to the cities, the presence of kin at destination plays an important role in the decision of parents to let their daughters migrate (Jelin 1977, p. 137; Camacho 1999, p. 69).

It has been often argued that by focusing on collective family strategies, the bargaining power of individual family members and the potential for conflict and interaction among them remain hidden

(England and Farkas 1986; Folbre 1987; Hondagneu-Sotelo 1994; Faist 1997, p. 191; Viazzo and Lynch 2002). Women might well have had their own motives and strategies for migration, and previous research suggests that they did indeed play an active role in determining what happened (Cerrutti and Massey 2001; Bras 2003, pp. 228–30).

Social capital theory

Theoretical notions of household strategies and the allocation of parental resources are based on a view of the family as a closed system, emphasizing parent–child ties. These notions suggest an indirect way of looking at the impact of siblings, via the coordinating activities of the parents. Social capital theory provides a different perspective on the interdependence of siblings, one that stems from a focus on lateral ties between them. Social capital refers to the resources which, although possessed by other persons, are available to a given individual through his or her social relations with these others and as a result of the structural characteristics of the network in which all concerned are embedded (Coleman 1990; Flap 1999; Lin 2001). In recent years, social capital theory has become an important framework for understanding migration patterns (Massey et al. 1993, 1994; Palloni et al. 2001). Ties to migrants increase a person's social capital, lowering the costs of migration and augmenting expected net returns. Over time, migration becomes self-perpetuating because each migration creates more social capital and so promotes further migration. The self-promoting process by which migration induces changes in social and economic structures that make additional migration likely has been described as the cumulative causation of migration (Massey 1990, pp. 4–5; Massey and Espinosa 1997, p. 952).

Research shows that the particularly strong ties inherent in kin networks play a key role in steering migration (Wilson 1998, p. 401; Davis et al. 2002, p. 308). The importance of spread-out family networks has been demonstrated in research on historical migration (Pooley and Turnbull 1998; Hochstadt 1999), Asian rural–urban migration (Trager 1984; Findley 1987; Lauby and Stark 1988; Root and DeJong 1991), and international migration from Mexico to the USA (Menjivar 1995; Massey and Espinosa 1997; Wilson 1998; Cerrutti and Massey 2001; Davis and Winters 2001; Palloni et al. 2001; Davis et al. 2002; Curran and Rivero-Fuentes 2003).

As important members of kin networks, siblings can provide significant resources. Historical studies show that brothers and sisters were often stepping stones, disseminating information before migration, offering support during the migration process itself, and providing help in occupational and residential choice at destination (Janssens 1993; Rosental 1999, pp. 119–97; Hareven 2000, pp. 37–62). Similarly, ethnographic research has shown how siblings worked together at specific job sites, while sibling clusters also lived in the same neighbourhood or shared a house (Wilson 1998, pp. 400–1).

The impact of social networks on migration differs according to destination. Social networks have been found to be more important for international than for internal migration (Taylor 1986; Curran and Rivero-Fuentes 2003, p. 289) and more relevant for urban than for rural moves (Davis et al. 2002), which is not surprising given that moves to another country or to an urban centre are often costlier and based on more limited information about the destination (Taylor 1986). Moreover, social networks have a gendered nature that influences their effects in generating migration. Some studies have found that women's networks increase the migration of women while networks of men are more relevant for prospective male migrants (Cerrutti and Massey 2001; Curran and Rivero-Fuentes 2003, p. 289). Men and women have different sources of support and when there is a gender division in the destination labour market they may need different kinds of information and contacts. Female migrants from Mexico, Guatemala, and El Salvador, the majority of whom worked as domestic labourers, benefited more from the advice and contacts of previous female migrants than from those of male migrants who worked as unskilled labourers. Especially in domestic work, sex-specific migration was promoted by the fact that employers asked former migrants among existing workers for references on new migrants seeking work (Hondagneu-Sotelo 1994). However, another study found that networks of men and women could act as substitutes for each other in steering women's migration (Davis and Winters 2001, p. 1). The existence of gendered occupational niches at destination determines whether or not the effects of a migration network will be sex-specific (Davis and Winters 2001, p. 5).

The regions of Zeeland and Pays de Herve

The regions under study are Zeeland and the Pays de Herve. Zeeland, which mainly consists of islands

and peninsulas, is situated in the farthest south-western corner of the Netherlands, bordering on Belgian-Flanders to the south. The Pays de Herve is an agrarian region in eastern Belgium which shares a border to the north with the Dutch province of Limburg (see Figure 1). Although both regions could be characterized as rural, their agricultural orientation differed considerably in earlier times. On the sea clay of Zeeland, market-oriented, capital-intensive arable farming was practised, to produce such crops as wheat, flax, and madder (Priester 1998). The Pays de Herve, on the other hand, was characterized by a predominance of small-scale cattle farming. As a result of these different modes of production, occupational structures differed widely. In Zeeland, wealthy grain-growing farmers with large estates were dominant, but they represented only a small part of the population—15 per cent of all household heads. More than half of all households belonged to the unskilled agricultural labouring class (Bras 2004, p. 247). In the Pays de Herve, by far the most important group were cattle-breeding tenant farmers, who rented small-to medium-sized farms; they made up almost half of all Hervian households (Neven 2003) (see also Appendix).



Figure 1 Map indicating the two research areas: Zeeland in the Netherlands and Pays de Herve in Belgium

Both regions were located relatively close to the centres of industrialization and urbanization of their respective countries—the industrializing region of Wallonia in eastern Belgium and the urbanized western provinces of the Netherlands. In Belgium, industrialization started early and intensively at the very beginning of the nineteenth century; textile and heavy metal industries were the most prominent economic sectors. The Netherlands had been a relatively urbanized country from the sixteenth century onwards. It was also highly commercialized, particularly in its western parts. However, industrialization and further urbanization did not start until after about 1850. The process entailed intensification of trading, shipping, and building in the port cities of Rotterdam and Amsterdam and an expansion of the administrative, governmental, and commercial sectors in the city of The Hague.

Possible regional influences on women's migration

Zeeland and Pays de Herve differed widely in the employment opportunities available. For Zeeland women, there were plenty of opportunities in the burgeoning cities of Rotterdam, Amsterdam, and The Hague; in particular there was a large demand for female domestic servants by the growing urban middle and higher classes (Van Zanden 1985; Diederiks et al. 1987; Poelstra 1996). Farm work was abundant in Zeeland, both for boys and girls, but parents usually sent their daughters into farm service or domestic service, while sons were kept at home and worked in the fields. This gender-specialization of tasks occurred because female field workers were paid less than male labourers and because work in domestic service, especially in the cities, was far more lucrative for girls (Kloos 1989, pp. 34–5). Entering service for a period was a common transition in Zeeland women's lives, one experienced by almost 40 per cent of all Zeeland women born between 1835 and 1927 (Bras 2004, p. 247). In the Pays de Herve on the other hand, where most households consisted of small-scale tenant farmers, the labour of unmarried sons and daughters could be well used in the parental household and on the farm. As a result of their greater usefulness at home, and because the hiring of servants was uncommon, entering service was far less common for women in the Pays de Herve. If Hervian women migrated, they often sought work in the industrial Walloon cities, mostly in the textile industry (see also Bras and Neven 2007).

As a result of different employment opportunities and reasons for migration, the influence of siblings was likely to have differed between the two regions. In Zeeland, employment opportunities for boys and girls diverged. Moreover, the migration of Zeeland girls was directed to the sex-specific niche of service. The options and constraints of Zeeland women might thus have been more influenced by the previous activities of their sisters than by that of their brothers. In the Pays de Herve region, the activities of boys and girls were more similar; many were kept at home until marriage and helped on the farm. When Hervian women migrated to urban jobs in the Walloon industries, information and support provided by both sisters and brothers who had migrated previously might have been helpful. Thus, the influence of siblings on women's migration might have been less sex-specific in the Belgian region.

We expect that the presence of many younger siblings enhanced the probability that women would migrate. Large households became easily overcrowded and it is unlikely that all girls were needed on the farm or in the household. Owing to the more sex-specific division of tasks in Zeeland, having a number of (younger) sisters was particularly likely to have increased women's prospects of migration there. Conversely, these prospects would have been decreased by having a number of co-resident older brothers contributing their earnings to the household. Because they constituted social resources, brothers and sisters who had migrated earlier would have increased women's prospects of migrating. It is very likely that these earlier migrants from the family, especially sisters in the case of Zeeland, directed women to their own rural or urban locations.

Changes in the composition of the household would also have affected women's prospects of migrating. A sibling who returned to the household would have been able to claim part of the household's economic resources, especially if he or she was not gainfully employed. This probably increased other siblings' likelihood of migration. The returned migrant might also have stimulated young women's migration by disseminating information on housing and job opportunities at a prospective destination. Another event that could have important effects was the marriage of a sibling. Married brothers and sisters who departed from the parental home and settled elsewhere could have provided places for their single sisters to stay, thereby making it easier for them to migrate earlier. On the other hand, in terms of household strategies, younger sisters might have been expected to make up the loss in household earnings caused by the marriage of a sibling. Zeeland

women might have had to do this by moving into service in rural or urban locations. It is possible that in the Pays de Herve, this particular effect did not exist, since unmarried children could be well used at home. Other events that could have increased young women's prospects of migrating by adding burdens to the household economy were the death of a sibling (especially if of working age) and the birth of a sibling.

A number of household characteristics could also have influenced migration. Women from unskilled labouring-class families might have been more likely than women from better-situated families to migrate in order to contribute to the family budget. In both regions, farmers' daughters were probably the least likely to migrate because of the value of their work on the farm. Moreover, social class and migration destination probably interacted. Daughters from unskilled labouring families were most likely to migrate to rural destinations, because this helped to ensure a regular contribution to the household budget and meant that daughters could return home easily in case they were needed. Dutch government reports suggest that long-distance migration of daughters had the effect of stopping or drastically reducing their contribution to the family's income (*Algemeen overzicht* 1908, pp. 285–6, 290–1). In addition, poor families were less able to provide for the costs of long-distance migration. Families with a higher income, on the other hand, would have been better able to finance migration to urban centres and to dispense with the contribution to income of a co-resident wage-earning daughter. Finally, it is possible that social networks that facilitated urban migration were larger in middle and higher social classes than in the working class.

The death of a parent had immediate consequences for a household's economic resources (Derosas and Oris 2002). Half-orphaned girls might have migrated in order to economize on boarding and lodging, and to contribute remittances to the reduced family budget. Migrating was also a way of relieving tensions in relationships with a new step-mother or stepsibling. Moreover, the death of one of the parents, especially of the father, could also have increased a woman's autonomy, thus making it easier for her to leave. Parents' social ties and resources could have hampered or stimulated a daughter's migration. One indicator of parental social capital is the geographical width of their network. A widespread network could have stimulated daughters to leave home and migrate to urban destinations, but for women with a locally based network, it could have been more profitable to stay

at home or migrate to rural destinations (Fischer et al. 1997, pp. 73–9). Childhood experience of migration with parents is another factor likely to have influenced women's prospects of migrating independently. Family migration can stimulate the future migration of members by creating a 'family culture of migration' (Findley 1987, p. 168; Faist 1997, p. 210; Camacho 1999, pp. 68–9). On the other hand, frequent family migrations might also have been a sign of weak anchorage in the community. Migration might then have offered alternative opportunities for employment to girls whose families were unable to help find them locally.

Finally, opportunities for migration of females were probably influenced by fluctuations in the economy. Young women whose birth or adolescence occurred during the agricultural crisis of 1875–90 were likely to have had higher migration risks. The effects on women were not limited to the loss of employment opportunities that occurred during the agricultural crisis and the ensuing restructuring of agriculture. Adverse conditions in early youth could also have had effects later in life as a result of cumulating disadvantage (O'Rand 1996, pp. 230–6; Settersten 1999, pp. 130–2). It is possible that young women who experienced the crisis were more likely to have migrated to urban destinations, because of the alternative employment opportunities there. Alternatively, they might have been more likely to migrate to other rural areas because they could not afford to go to urban areas and did not have access to the social networks that facilitated migration to the cities.

Data, methods, and measures

The life courses of Zeeland and Hervian women and their parental families were reconstructed from municipal population registers, which were established around 1850 in Belgium and the Netherlands (Gutmann and Van de Walle 1978; Alter 1988; Knotter et al. 1995; Neven 2003). This source provides longitudinal data on migration paths and changes in civil status. While the source material was almost the same, the design of the samples from the two regions differed in important ways.

The Belgian sample is based on the complete records of the population registers of three villages located in the heart of the Pays de Herve, namely, Charneux, Clermont, and Neufchâteau. Together these three villages had between 4,500 and 5,000 inhabitants during the second half of the nineteenth century. All people who lived between 16 October

1846 and 31 December 1900 in these villages were entered into the computer, even if they had lived there for only a few days. In this way, information on almost 5,000 single women aged 12–50 over a 54-year period (1846–1900) was collected. However, most of this information refers to particular parts of a life course since if women migrated out of the villages, they were lost from observation. While they remained in the three villages in the Pays de Herve, dates and details of births, deaths, marriages, widow(er)hood, in-migrations, and out-migrations of all household members could be obtained. On average, women were observed for 9.5 years, until they migrated (48.6 per cent), married (23.1 per cent), reached age 50 (5.5 per cent), died before they reached the age of 50 (5.9 per cent), or until the recording of events in the population registers ended in 1900 (17 per cent).

In the Dutch case, the life courses of a sample of 0.5 per cent of the population of females, born on five islands and peninsulas of the province of Zeeland between 1845 and 1922, were reconstructed, even for periods when individuals migrated out of their birthplace or province. The sample was part of a larger nation-wide sample, The Historical Sample of the Netherlands (HSN) (Mandemakers 2000). These five regions, namely, Schouwen-Duiveland, Tholen, Sint-Philipsland, Noord-Beveland, and Zuid-Beveland, were selected because of the availability of population registers for the whole period under study. The original sample for this part of the province of Zeeland contained 432 women. To augment this sample, we attempted to reconstruct also the life course of one of the sisters of each of these women, if available. The outcome was a study population of 772 women, comprising women from 432 families of which 340 families were represented by two sisters and 92 by only one. The life courses of those women who survived to age 12 ($N=732$) were reconstructed until they married or, if they did not marry, at least until the age of 40. Some 75 per cent of these women were followed until marriage or age 40 ($N=580$). Of the 580 life courses, 192 could not be completely reconstructed. In half the cases the reason was incorrect or missing data in the population registers ($N=91$). A further 15 per cent were incomplete as a result of emigration out of the Netherlands ($N=27$), 12 per cent because of untimely death ($N=22$), and 27 per cent because the period of observation was interrupted by the ending of population registration in 1940 ($N=52$).

We made the data-sets as comparable as possible and selected only women living in rural communities, that is, locales with a population of fewer than

5,000 residents or communities with a population of between 5,000 and 20,000 residents but with more than 40 per cent of the men employed in agriculture. The three communities in the Belgian data-set remained rural during the whole period under study. In the Dutch case, life-course episodes were selected for analysis only for women who lived in rural communities in Zeeland. Using data from the 10-yearly Dutch censuses, we knew whether and when communities were rural. Imposing this selection criterion on the Zeeland data-set left us with 593 women (of the original 732) who originated from 340 families. In the Pays de Herve, 3,442 women from 1,793 families were studied. Eventually however, because Zeeland women were followed over longer stretches of time, the number of events analysed were approximately the same: 154 rural migrations and 144 urban migrations of Zeeland women and 176 rural migrations and 182 urban migrations of Hervian women (see Appendix).

In order to chart the relative risks of migration, we applied event-history analysis, which models transitions across a set of discrete states while including the waiting time between entry and exit from each specific state (Allison 1984; Blossfeld and Rohwer 1995, p. 33). The waiting time or duration is the time in days that elapses from the age at which women were first at risk of migrating until the first move to a rural or urban location. In this study, the particular event-history model applied is the Cox proportional hazards model, which uses the hazard function to estimate the relative risk of a transition. The hazard function is a rate that estimates the risk of, for instance, migrating independently to an urban location at a particular moment, given that a person has been with her parents until that moment. A major advantage of the Cox model is that it can include explanatory variables that change over time, so-called time-dependent covariates. In the present study, the activities of siblings are important variables that change over the waiting time to migration.

An important assumption of the Cox model is that observations are independent and that the proportionality of the hazards from one individual to another does not vary. Thus, for two individuals, the ratio of their hazards must be a constant. In order to obtain proportional hazards, the population under study was limited to unmarried women in the age group 12–30 years old who migrated independently for non-marriage-related reasons. The age of 12 is when most children finished primary school, so we assume that it is from this age that they started to be at risk of leaving home. Because most women were married by age 30 in both regions, we assume

that the first migration of unmarried women older than 30 occurred for other reasons; therefore, observations were stopped and right-censored at the age of 30.

Since our data-sets contain clustered data, namely, life courses of sisters in the same families, we estimated Cox proportional hazards models with shared-frailty terms (Venables and Ripley 1999). The frailty model derives its name from the idea that individuals in different categories, such as women in different families, run different risks of migration owing to genetic or unmeasured environmental circumstances. In order to allow for this unobserved heterogeneity, we estimated a random effect in the form of a frailty term, which is a continuous variable with a gamma distribution that describes excess risk (or frailty) for distinct families (Therneau and Grambsch 2000, p. 231). Except for the models estimating the relative risks of urban migration of Hervian women (without the effects of siblings, see Table 2) and rural migration of Zeeland women (see Table 3) unobserved heterogeneity did not play a role.

We distinguished between rural and urban migration because we expected them to be affected differently by social networks and social class background (see theory and hypotheses sections). Migrations to rural or urban destinations were defined as independent moves from the parental home. To be eligible, women needed to have been living with at least one of their parents before they migrated, and to have left the parental home without either of them. Duration of risk was measured in days as the time that elapsed from the age of 12 until the age of the first move from the parental home for a rural or urban destination or until censoring. The influence of siblings was measured by the number of older and younger brothers and sisters registered in the household when the women under study were aged 12. A set of 12 time-dependent variables were constructed measuring the previous number of specified experiences of brothers and sisters that took place after the women under study had reached the age of 12. These experiences comprised migrations to rural destinations, migrations to urban destinations, return migrations, and births, marriages, and deaths. These are all time-dependent variables; for instance, each time a brother marries the variable 'number of brothers married' increases by one.

Zeeland women were divided into nine 10-year birth cohorts covering the period 1840–1929, while Hervian women were divided into 10-year birth cohorts covering the period 1820–89. As an indicator of the socio-economic status of the household,

the job title of its head, as recorded in the population register, was used. We distinguished six occupational groups, which are meaningful for our regions: elite and petty bourgeoisie, artisans, farmers, skilled labourers, unskilled labourers, and (for the Pays de Herve only) a group without occupation. The presence of parents, a time-dependent variable, was measured by relating moments in a woman's life course to the presence or absence of her parents in the household. Four categories were constructed: both parents present, only mother present, only father present, and both parents absent. A variable 'parental migration' measures the parents' experience of migration before the birth of the women under study. To construct this variable, we compared the birthplaces of both parents with that of the woman herself. Three categories were constructed to measure an increasing experience of migration: both father and mother were born in the birthplace of their child, only one parent was born there, and both parents were born in other communities. 'Family migration' is a time-dependent variable that measures the migration experience of a woman's parental family after her birth. We constructed this variable by comparing the birthplace of the woman under study with the current place of residence of the parental family. Two categories were constructed measuring whether or not women and their parental families migrated.

Results

In both the Zeeland and the Pays de Herve regions, families were large and siblings were numerous. The average household size when Hervian women were aged 12 was 7.7. It was 6.7 in the Dutch area. This means that women whose parents were still living had about four siblings. In the Pays de Herve, only 4 per cent of girls aged 12 did not live with any siblings, while 7.4 per cent of all Zeeland girls did not have brothers and sisters living with them at age 12 (see Table 1). This did not mean that they had none of course; siblings might have been older and left home already, or they might have died; and of course, a sibling might have appeared a year later if one had been born or returned home. Some of the Hervian families were rather large, as we had expected of a region of high legitimate fertility: 12.4 per cent of all girls aged 12 had at least three older and three younger siblings. Almost exactly the same was true for the Zeeland girls. Sibling structure was thus remarkably similar in both regions.

Table 1 Numbers of siblings in the households of girls aged 12 in the regions Zeeland (the Netherlands) and Pays de Herve (Belgium), 1829–1940

	Younger siblings				
Older siblings	0	1	2	3+	Total (per cent)
Pays de Herve					
0	4.0	3.1	3.4	13.4	23.9
1	3.2	2.5	3.7	10.3	19.7
2	3.5	3.2	3.6	7.8	18.1
3+	10.7	8.6	6.7	12.4	38.4
Total (per cent)	21.4	17.4	17.4	43.9	100.0
Total (<i>N</i>)	553	450	450	1,136	2,589
Zeeland					
0	7.4	3.3	2.7	7.3	20.7
1	3.4	4.1	3.6	9.7	20.9
2	3.2	2.9	3.6	7.8	17.4
3+	9.0	10.6	8.6	12.8	41.0
Total (per cent)	23.0	20.9	18.5	37.6	100
Total (<i>N</i>)	168	152	135	274	729

Source: HSN release MFZ.02/MFZ.03 (Zeeland, the Netherlands) and Population Registers Charneux, Clermont, Neufchâteau, 1846–1900 (Pays de Herve, Belgium).

To investigate the effects of siblings on migration we followed a two-step procedure. First, we estimated the impact of birth cohort and household characteristics on rural and urban migration (Table 2). As the second step, we added to the model the number of older and younger brothers and sisters of the woman when she was aged 12 and the previous transitions they had experienced (Table 3).

As expected, growing up during an agricultural crisis, or in its aftermath, had enhanced women's prospects of migration. This was true for Hervian women born before 1830 who had experienced the potato crisis of the 1840s, and for Zeeland and Hervian women raised during the international agricultural crisis in the third quarter of the nineteenth century (birth cohorts 1860–89). However, the experience of agricultural depression accelerated the migration of women to rural destinations, and not, as might also have been expected, their migration to urban areas. The accumulated disadvantage of households who experienced the depression might have forced young women to accept (farm) service positions in rural areas. Moreover, migration to urban areas was costly and intending migrants needed specific guidance on what would be entailed. In Zeeland, it was the daughters of unskilled labourers who were more likely to migrate to rural destinations, while girls from the elite and petty bourgeoisie migrated more frequently to the cities. In the Pays de Herve, both women originating from the elite and petty bourgeoisie, and women from unskilled labourers' households were more likely to

move to the cities. Regional differences in employment opportunities for labourers' daughters are evident here: entering farm service was the most available option for Zeeland's labouring-class girls, while positions in industry in the Walloon cities were an option available to Hervian girls from the same social class. Although destinations differed, the migration of women in both groups might have been a product of similar household strategies. On the other hand, the migration of women from the higher social classes to urban areas can be better understood within the framework of social capital theory. These groups could use larger social networks, which, amongst other advantages, made it easier for them to migrate to urban areas.

The destinations to which Zeeland and Hervian girls departed when one of their parents was absent differed considerably. When a father died and a widowed mother headed the household, the likelihood of girls in Zeeland migrating to rural destinations doubled. The absence of a father was a major constraint on the family budget. Girls who worked in farm service in the vicinity could remit their wages and return easily. For women from the Pays de Herve the opposite situation seems to have applied. Hervian girls whose father was absent were more likely to depart for the city than for a farm. Perhaps the Belgian girls gained more freedom in the absence of the authority of the male household head. It is more likely that their urban migration was the result of a household strategy geared towards

Table 2 Effects of birth cohort and family characteristics on the relative risks of rural migration and urban migration of women aged 12–30 from the regions Zeeland (the Netherlands) and Pays de Herve (Belgium), 1829–1940. Shared-frailty Cox proportional hazard models

	Zeeland		Pays de Herve	
	Rural migration	Urban migration	Rural migration	Urban migration
Birth cohort				
1817–29	– ¹	–	2.38***	1.85***
1830–39	–	–	1.10	0.40***
1840–49	0.44	0.00	0.63	0.49**
1850–59 (ref.)	1.00	1.00	1.00	1.00
1860–69	2.64**	0.88	2.27****	1.14
1870–79	2.83***	1.26	1.98**	1.73**
1880–89	1.31	1.13	3.47****	0.53
1890–99	1.94	2.08	–	–
1900–09	1.24	1.87	–	–
1910–19	0.68	1.19	–	–
1920–29	1.43	0.90	–	–
Occupational group of head of household				
Elite and petty bourgeoisie	0.69	2.76**	0.90	2.02**
Artisans	2.03	0.00	1.35	1.38
Farmers (ref.)	1.00	1.00	1.00	1.00
Skilled labourers	1.55	0.87	1.37	0.98
Unskilled labourers	1.76*	1.33	1.89	2.75****
No occupation	– ¹	–	0.79	2.06**
Presence of parents				
Both present (ref.)	1.00	1.00	1.00	1.00
Father absent, mother present	2.25**	0.59	1.28	2.23****
Mother absent, father present	1.50	3.26***	1.69***	1.51*
Both absent	4.59***	0.00	0.00	0.00
Parental migration				
Parents born in birthplace of woman (ref.)	1.00	1.00	1.00	1.00
One born outside woman's birthplace	1.17	1.91*	1.54*	0.85
Both born in other communities	1.31	1.60	1.22	0.76
Birthplaces unknown	0.00	0.00	–	–
Family migration				
No migration (ref.)	1.00	1.00	1.00	1.00
Migrated	1.95***	1.55	1.89****	1.07
Frailty standard deviation	0.81	0.71	0.84	1.41**
Likelihood ratio test	191****	106****	274****	489****

Notes: ¹No data available. (ref.) = reference category. *Significant at 0.10 level; **significant at 0.05 level; ***significant at 0.01 level; ****significant at 0.001 level.

Source: As for Table 1.

supplementing the household budget, as was the case in Zeeland.

When their mothers had died and Zeeland women were left with a widowed father, their chances of migration to the cities dramatically increased. The entry of a stepmother and less need to remit wages than in the situation in which the father had died, might explain the increased ‘opportunity’ of urban migration. Hervian girls were also more likely to migrate to urban areas after their mothers’ deaths, but they were much more likely to move to rural destinations, possibly to join the households of kin,

in which they might have worked without remuneration. In both regions, girls migrated as a reaction to parental death. The difference in type of destination shows how different regional employment opportunities for women interacted with intra-household decision-making to influence women’s options.

We had expected that parents’ own migration experience would increase women’s chances when parental migration meant a large social network, and decrease them when parental migration was a sign of weak anchorage. The results show that in both regions women originating from families in which

Table 3 Effects of the presence and activities of siblings on the relative risks of rural migration and urban migration of women aged 12–30 from the regions Zeeland (the Netherlands) and Pays de Herve (Belgium), 1829–1940. Shared-frailty Cox proportional hazard models¹

	Zeeland		Pays de Herve	
	Rural migration	Urban migration	Rural migration	Urban migration
Presence of sisters at age 12				
Number of older sisters	1.06	1.17	0.93	0.97
Number of younger sisters	1.15*	1.22**	1.33****	1.12
Presence of brothers at age 12				
Number of older brothers	0.85*	1.08	0.99	1.00
Number of younger brothers	0.97	0.99	1.00	1.12
Number unknown	–	–	1.68	1.29
Previous transitions experienced by sisters				
Number of sisters migrated to rural destinations	2.18***	1.69	2.10****	1.34
Number of sisters migrated to urban destinations	1.36	3.94****	1.14	1.71****
Number of sisters migrated to unknown destinations	–	–	1.31	1.52
Number of sisters married	2.33***	1.53	0.93	0.77
Number of sisters died	0.62	1.73	0.88	0.71
Number of sisters born	1.77	1.57	1.45**	1.40**
Number of sisters returned to the household	0.56	0.57	1.12	0.95
Previous transitions experienced by brothers				
Number of brothers migrated to rural destinations	1.06	0.25**	1.79****	1.36*
Number of brothers migrated to urban destinations	1.83	0.91	1.66**	1.63**
Number of brothers migrated to unknown destinations	–	–	1.45	0.89
Number of brothers married	2.23*	1.15	0.80	0.83
Number of brothers died	0.86	1.48	1.44*	0.92
Number of brothers born	1.22	0.81	0.71*	1.54****
Number of brothers returned to the household	1.19	2.93**	0.95	1.57**
Frailty standard deviation	0.89*	0.00	0.00	0.71
Likelihood ratio test	244****	86.80****	180****	364****

Notes: ¹Models also include controls for cohort and family characteristics as in Table 2. *Significant at 0.10 level; **significant at 0.05 level; ***significant at 0.01 level; ****significant at 0.001 level.

Source: As for Table 1.

one parent was born outside the woman's birthplace increased the probability of migration, though the destinations differed. Women in Zeeland with one parent who had had migration experience were more likely to migrate to rural destinations; Hervian women more often made an urban move. If extensive network contacts determined the increased migration chances of these women, women with two parents with migration experience should have been even more likely to migrate. Because this was not the case, it seems more probable that mixed geographical background was an indicator of marginalization, which might have driven families to send their daughters away to work.

Secondly, in both regions, women who had migrated with their parents in youth were more likely to depart to rural destinations than those who had always remained in the same place. In Zeeland, frequent family migration, like parental migration, seems to have been a sign of smaller networks in the

local community, with girls from mobile families moving into farm service, perhaps because they had few other opportunities. In the Pays de Herve, the fact that women remained in the countryside and did not head for the more remunerative jobs in the cities provides less evidence of a short-term household strategy to supplement the family income. However, women might have moved into rural households of relatives or acquaintances as an unpaid help. They would not have been able to remit money home by doing so, as the Zeeland women most probably did, but they would have relieved their parental families of the burden of feeding and housing them.

After adding the sibling covariates to the model, the effects of the other variables hardly changed, but the fit of the models improved; the effects of the siblings were thus clearly independent and additive. The results in Table 3 show that the higher the number of younger sisters present in the household when women were aged 12, the higher were Hervian

women's chances of rural migration. Zeeland women with many younger sisters had increased relative risks of rural and urban migration. We find evidence of arrangements based on age ordering among female siblings, with the existence of younger girls appearing to be a cause of their older sisters leaving. The more brothers present, the smaller were Zeeland girls' chances of moving to rural destinations. Brothers of working age who worked in the fields or on the farm, would have been able to act as substitutes for their sisters in supplementing the household budget.

The behaviour of their sisters strongly affected the likelihood of migration of women. Moves made previously by their sisters not only increased Zeeland and Hervian women's migration prospects but also encouraged them to move to the same types of destinations as their sisters. The more sisters of Zeeland women had previously married, the more likely they were to migrate to rural destinations. By remitting wages after migrating to enter service, women could substitute for the financial loss to the household that had occurred when a sister had married. The finding that women were specifically likely to leave for a rural destination supports the speculation that a response to economic distress was the underlying cause. However, in the Pays de Herve, having married siblings did not significantly affect women's migration behaviour. As pointed out earlier, entering service did not play a significant role in the household economy of eastern Belgium and urban migration might not have led to the remittance of wages as a contribution to the household budget. On the other hand, in the Pays de Herve newborn sisters significantly increased women's chances of migrating to rural or urban destinations, confirming sex-specific age ordering as a household strategy. Deaths and births of sisters did not affect Zeeland women's migration probabilities.

There are very interesting differences between the two regions in the influence of brothers' behaviour. In the Pays de Herve, brothers' previous moves affected women's migration behaviour at least as much as those of their sisters. The larger the number of brothers who had migrated previously to rural and urban destinations, the more likely were Hervian women to migrate too. The influence of brothers' migration was, however, less location-specific than that of their sisters' previous movement. Conversely, whether brothers previously had migrated did not affect the migration risks of Zeeland women. On the contrary, the more brothers who had formerly migrated to rural locations, the smaller Zeeland women's chances became of migrating to a city.

That women were more often kept at home as a result of their brothers' moves might indicate substitution as a household strategy. Brothers who migrated regionally and remitted their wages might have made it possible for their sisters to stay at home. In that case, Zeeland women too should have had lower chances of migrating to the countryside. It seems more probable that many of the rural moves among brothers are indications of rural-based social networks that facilitated migration for certain families. This inference is also supported by the significant frailty term for the model of rural migration of Zeeland women, indicating unobserved family effects.

The larger the number of brothers who had returned to the household, the greater were Zeeland and Hervian women's prospects of migrating to urban areas. Returned migrants were carriers of contacts and information. Moreover, with many working-age brothers present, there might have been more financial support for girls to move to urban areas. Women's likelihood of migration in the Dutch area increased when brothers had recently married, as was the case for the prior marriages of sisters. In the Pays de Herve this effect was not found. In the Belgian region, births and deaths of brothers affected women's migration behaviour. When a brother died, Hervian women's chances of rural migration increased. When new brothers were born, just as when female babies arrived, the likelihood of women departing for urban destinations increased, indicating age ordering as a household strategy in migration. Newborn brothers apparently had the effect of decreasing their sisters' chances of migration to rural destinations, but because this isolated result has a rather low significance level, further hypotheses are not warranted.

Discussion and conclusion

This study has explored the extent to which brothers and sisters shaped young women's risks of rural and urban migration, using longitudinal data collected from population registers in two rural regions of Belgium and the Netherlands during the second half of the nineteenth century and the first decades of the twentieth. Our results from shared-frailty Cox proportional hazard analyses show that in both regions siblings exerted an additive impact on the migration of females, independently of temporal and household characteristics. In influencing this migration, brothers and sisters competed for scarce resources and parents made different trade-offs among their

children based on birth order and sex. Through differential parental resource allocation, siblings influenced each other indirectly, via the coordinating activities of their parents. Siblings also affected the migration of females directly. They paved the ways for the process of migration; their previous migration experience and the resources and information they had to offer increased women's prospects of migration. Nevertheless, exactly how and why siblings influenced young women's migration depended on the modes of production in the two regions and on regional and national employment opportunities.

In Zeeland, the way siblings influenced each other was highly sex-specific with the lives of sisters being strongly interdependent. This sex-specificity was rooted in divergent employment opportunities for boys and girls. Especially in the large group of agricultural labourers, parents chose to send their daughters into service, while sons usually worked in the fields. The presence of female siblings and the specific birth order of women among them were crucial in shaping unmarried girls' migration chances. Via parental trade-offs based on chronological age ordering, younger sisters appeared to 'push' their older sisters out of the household and into gainful labour. Moreover, when siblings married and left the parental household permanently, Zeeland women had to substitute for the loss of household income and were placed into urban domestic service or farm service. The effects on the migration process of siblings as a form of social capital were also sex-specific. Apparently, the resources offered by previously migrated brothers were of less use to prospective female migrants than the advice of their sisters, who channelled the new migrants into the women's occupational niches of rural farm service and urban domestic service.

In the Pays de Herve, where most households consisted of medium-sized tenant farmers and the labour of unmarried sons and daughters could be well used in the parental household, domestic or farm service was not a common life-course experience. Since children were required to work on the farm, they less often had to contribute to the household income by migrating and entering paid employment. Migration was therefore less important as a way of supplementing family budgets by remitting wages. The migration of females from the Pays de Herve was influenced primarily by the size of the sibship, by the presence of younger siblings at age 12, and by the births and deaths of new siblings. Thus, household strategies of migration were primarily geared towards regulating household size. As in Zeeland, siblings were important as social re-

sources in the migration process. However, the effects of siblings were less sex-specific in the Belgian area. Since Hervian women migrated into urban employment opportunities in Walloon industry, the contacts and resources of both their sisters and their brothers were important. The comparison of the two regions shows that the gendered nature of social networks and the sex-specificity of siblings' effects depended strongly on context.

To what extent did women's own decision-making play a role in migration? And how did it relate to siblings' activities? Although we have not been able to apply a stringent test to discriminate between the competing explanations of household decision-making and social capital theory as frameworks for interpreting the effects of siblings' previous migration on women's likelihood of migration (see also Palloni et al. 2001, pp. 1274–6), the results suggest that explanations referring to social capital offer a more useful way of understanding our results. If siblings' migrations were an indicator of a strategy of household decision-making based on the fact that the migration of one household member reduced the costs of migration of other members, the inclusion of previous siblings' migration (Table 3) would have attenuated the effects of the parental and family migration variables (Table 2). However, not only did it not do so, siblings' effects on migration were additive and independent. This suggests that the more siblings had previously migrated, and the more resources they had to offer, the wider the choice available to women. This widened choice offered by a spread-out sibling network probably increased a woman's power to decide for herself what she would do. In general, migration processes in families would have intensified lateral ties among siblings at the expense of vertical family coordination, and would have set sibling subsystems (Bank and Kahn 1975) more clearly against parental authority, affecting the intra-household balance of power and the bargaining positions of family members. Moreover, because rural and urban destinations selected different types of migrants, they might also have had different implications for who would be involved in decision-making about migration. Perhaps, because urban migration was more costly and generated fewer returns for the parents, the woman's personal wishes played a larger role. This of course remains to be ascertained in future studies of migration.

Our study is a first exploration of this issue, and many aspects of the interdependence of siblings deserve further theoretical explanation and empirical testing. Siblings might also have played important roles in the process of marriage and family

formation. It would be very useful to know whether and to what extent siblings mediated in marital alliances. In the past, strong linkages among siblings in the marriage process are evident in sibling exchange marriages, in which siblings from one family married siblings from another, and in marriages where men married their deceased brothers' wives (sororate), or women married their deceased sisters' husbands (levirate) (Segalen and Richard 1986, pp. 109–30; Sabeau 1998, p. 175). More generally, we need to find out whether social capital explanations also hold good for other demographic and social behaviour. Did siblings channel each other to social positions in ways similar to those we have found for migration, where brothers and sisters followed each other to the same type of geographic destinations? And in what ways did age ordering among siblings play a role in the timing of marriage? In some areas, cultural norms dictated that the eldest sister married before her younger sisters (Smith 1973; Alter 1988; Rheubottom 1988; Hareven and Adams 2003). How widespread was this phenomenon?

We examined the role of siblings in influencing transitions in early adulthood when siblings co-

resided in the parental household. In this life phase, siblings influenced each other mainly indirectly, via the decisions of their parents. But the assumption of parental authority does not hold in the same way for adult and elderly siblings. With the ageing and death of the parents and the likely collapse of the family unit in mind, it is intriguing to consider whether and how siblings might have influenced demographic behaviour in adulthood and old age. Future studies will have to show the relevance of the proximity and the potential support of brothers and sisters for the timing of important transitions later in the life course, such as old-age migration and mortality risks. Finally, a fuller understanding of the role of siblings in the social context that shapes demographic behaviour is warranted, not only to help us interpret the past, when sibling sets were large, but also to illuminate processes in today's less developed countries, where siblings play similar roles in migration processes, and in contemporary Western societies where the presence of large blended families, including stepsiblings and half-siblings, has become commonplace.

Appendix

Table A1 Means or percentages of variables used in shared-frailty Cox proportional hazard models of rural migration and urban migration of unmarried women aged 12–30 from the regions Zeeland (the Netherlands) and Pays de Herve (Belgium), 1829–1940

	Zeeland	Pays de Herve
Birth cohort		
1817–29	–	7
1830–39	–	17
1840–49	7	19
1850–59	9	16
1860–69	13	19
1870–79	17	16
1880–89	12	6
1890–99	16	–
1900–09	15	–
1910–19	9	–
1920–29	2	–
Occupational group of head of household		
Elite and petty bourgeoisie	15	8
Artisans	1	17
Farmers	21	46
Skilled labourers	10	11
Unskilled labourers	53	12
No occupation	–	6

Table A1 (Continued)

	Zeeland	Pays de Herve
Presence of parents		
Both present	81	65
Father absent, mother present	8	12
Mother absent, father present	9	13
Both absent	2	10
Parental migration		
Parents born in birthplace of woman	24	23
One born outside birthplace of woman	43	40
Both born in other communities	32	31
Birthplaces unknown	1	6
Family migration		
No migration	78	75
Migrated	22	25
Presence of siblings at age 12		
Number of older sisters	1.3	1.0
Number of younger sisters	1.5	0.9
Number of older brothers	1.3	0.9
Number of younger brothers	1.6	0.8
Percentage of number of siblings known at age 12	100	74
Previous transitions experienced by siblings		
Number of sisters migrated to rural destinations	0.25	0.18
Number of sisters migrated to urban destinations	0.20	0.11
Number of sisters migrated to unknown destinations	—	0.03
Number of sisters returned to the household	0.07	0.22
Number of sisters married	0.05	0.27
Number of sisters died	0.12	0.13
Number of sisters born	0.27	0.16
Number of brothers migrated to rural destinations	0.20	0.15
Number of brothers migrated to urban destinations	0.07	0.08
Number of brothers migrated to unknown destinations	—	0.03
Number of brothers returned to the household	0.06	0.18
Number of brothers married	0.04	0.16
Number of brothers died	0.16	0.13
Number of brothers born	0.14	0.17
Total number of families	340	1,793
Total number of women	593	3,442
Total number of episodes	1,381	15,911
Total number of rural migrations	154	176
Total number of urban migrations	144	182

Source: As for Table 1.

Notes

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- 2 This study was supported by a research grant from the Netherlands Organization for Scientific Research, for the project entitled 'Siblings and the Life Course. Mutual Relations, Diversity and Interdependence in

the Life Courses of Brothers and Sisters, c. 1860–1940' (grant number 016044010). The authors thank George Alter, Michel Oris, Gilbert Ritschard, and two anonymous referees of this paper for their helpful comments and suggestions.

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